

In the Claims

- 1-5. (Canceled)
6. (Original) A method for producing a high tensile strength hot-rolled steel sheet having superior strain aging hardenability with a tensile strength of 440 MPa or more comprising the steps of:
- heating a steel slab to 1,000°C or more, the steel slab comprising: in percent by mass,
- 0.15% or less of C;
- 2.0% or less of Si;
- 3.0% or less of Mn;
- 0.08% or less of P;
- 0.02% or less of S;
- 0.02% or less of Al;
- 0.0050% to 0.0250% of N; and
- optionally further comprising at least one selected from the group consisting of the following Group a to Group d, the ratio N (mass%)/Al (mass%) being 0.3 or more:
- Group a: 1.0% or less in total of at least one of Cu, Ni, Cr, and Mo
- Group b: 0.1% or less in total of at least one of Nb, Ti, and V
- Group c: 0.0030% or less of B
- Group d: 0.0010% to 0.010% in total of at least one of Ca and REM;
- rough-rolling the steel slab to form a sheet bar;
- finish-rolling the sheet bar at a finishing temperature of 800°C or more;

cooling at a cooling rate of 20°C/s or more within 0.5 second after the finish-rolling; and coiling at a temperature of 650°C or less.

7. (Original) A method according to according to Claim 6, further comprising the step of performing at least one of skin pass rolling and leveling with an elongation of 1.5% to 10% after the coiling step is performed.

8. (Original) A method according to either Claim 6 or 7, further comprising the step of joining consecutive sheet bars to each other between the steps of rough-rolling and finish-rolling.

9. (Previously Presented) A method according to Claim 6, further comprising the step of using at least one of a sheet bar edge heater for heating a widthwise end of the sheet bar and a sheet bar heater for heating a lengthwise end of the sheet bar between the steps of rough-rolling and finish-rolling.

10. (Canceled)

11. (Original) A method for producing a high tensile strength hot-rolled steel sheet having superior strain aging hardenability with a BH of 80 MPa or more, a Δ TS of 40 MPa or more, and a tensile strength of 440 MPa or more comprising the steps of:

heating a steel slab to 1,000°C or more, the steel slab comprising: in percent by mass,

0.15% or less of C;

2.0% or less of Si;

3.0% or less of Mn;

0.08% or less of P;

0.02% or less of S;

0.02% or less of Al;

0.0050% to 0.0250% of N; and

optionally further comprising at least one selected from the group consisting of the following Group a to Group d, the ratio N (mass%)/Al (mass%) being 0.3 or more:

Group a: 1.0% or less in total of at least one of Cu, Ni, Cr, and Mo

Group b: 0.1% or less in total of at least one of Nb, Ti, and V

Group c: 0.0030% or less of B

Group d: 0.0010% to 0.10% in total of at least one of Ca and REM;

rough-rolling the steel slab to form a sheet bar;

finish-rolling the sheet bar at a finishing temperature of 800°C or more;

cooling at a cooling rate of 20°C/s or more within 0.5 second after the finish-rolling; and

coiling at a temperature of 450°C or less.

12. (Canceled)

13. (Original) A method for producing a high tensile strength hot-rolled steel sheet having superior strain aging hardenability comprising the steps of:

heating a steel slab to 1,100°C or more, the steel slab comprising: in percent by mass,

0.03% to 0.1% of C;

2.0% or less of Si;

1.0% to 3.0% of Mn;

0.08% or less of P;

0.02% or less of S;

0.02% or less of Al;

0.0050% to 0.0250% of N;

0.1% or less in total of at least one of more than 0.2% to 0.1% of Nb and more than 0.02% to 0.1% of V; and
the balance being Fe and incidental impurities;
rough-rolling the steel slab to form a sheet bar;
finish-rolling the sheet bar at a finishing temperature of 800°C or more;
cooling at a cooling rate of 40°C/s or more within 0.5 second after the finish-rolling; and
cooling in the temperature range of 550 to 650°.

14. (Previously Presented) A method according to Claim 7, further comprising the step of using at least one of a sheet bar edge heater for heating a widthwise end of the sheet bar and a sheet bar heater for heating a lengthwise end of the sheet bar between the steps of rough-rolling and finish-rolling.

15. (Previously Presented) A method according to Claim 8, further comprising the step of using at least one of a sheet bar edge heater for heating a widthwise end of the sheet bar and a sheet bar heater for heating a lengthwise end of the sheet bar between the steps of rough-rolling and finish-rolling.

16. (New) The method according to Claim 6, wherein Al is present in an amount of 0.001% to 0.02%.

17. (New) The method according to Claim 11, wherein Al is present in an amount of 0.001% to 0.02%

18. (New) The method according to Claim 13, wherein Al is present in an amount of 0.001% to 0.02%.